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2017 OBC STRUCTURAL OVERVIEW

Presentation Synopsis

- The process by which the Ohio Board of Building Standards reviews the changes proposed by IBC code updates, both the major issues on a three-year cycle plus the interim amendments, for the creation the Ohio Building Code.

- The 2017 OBC major changes, primarily in Chapter 16 and Chapter 34, are reviewed from not only the IBC 2015 changes that are incorporated into OBC and the Ohio amendments to IBC.

Open Parking Garages

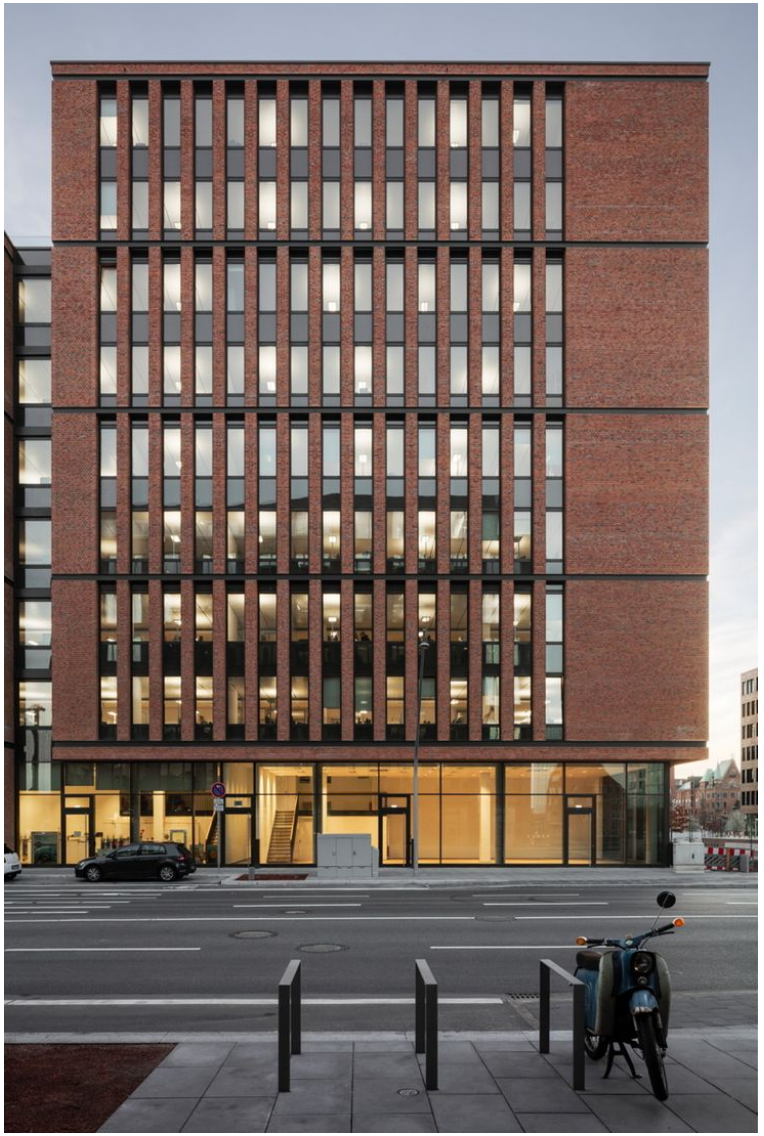
- 406.5.2.1 Openings Below Grade
- Ventilation requirements for below grade garage levels.

Storm Shelters

- 423.3 & 423.4 Critical Emergency Operations & Group E Occupancies
    - ICC 500, ICC/NSSA Standard for the Design and Construction of Storm Shelters
- Ohio falls within the ICC 250 mph tornado alley and, with the 2015 IBC, requires civil defense and most schools to have a storm shelter.
- Vult = 250 mph

Lintel Bottom Flange Fire Protection

- 704.11 Bottom Flange Protection
- Lintels, angles, plates spanning not more than 6’-4” when part of primary structural frame.
- No limit when not part of primary structural frame.



Exterior Wall Stability Bracing related to Fire Protection

- 705.6 Structural Stability
- Interior construction rating for bracing exterior rated walls.

Single and Double Fire Walls

- 706.2 Structural Stability
- NFPA 221Standards for High Challenge Fire Walls, Fire Walls, and Fire Barrier Walls.
- Tied and Cantilevered Options addressed

Permanent Ladders

- 1011.16 Ladders
- Permanent ladders are permitted for access in some situations.
- OMC Section 306.5 (Mechanical Code) for equipment access requirements.

Construction Documents

- Section 1603 Construction Documents
- Additional structural design loading required to be shown on the drawings, including drifting snow loads and photovoltaic panel dead loads.

Serviceability

- Table 1604.3 Deflection Limits
- Clarifications for loading vs. allowable deflection for exterior walls and interior partitions.

Risk Category

- 1604.5 Risk Category &

  Table 1604.5 Risk Category of Buildings and Other Structures
- Occupancy Category is now Risk Category
- OBC Table 1604.5, not ASCE 7-10 for Risk Categories

Structural Wall Anchorage

- 1604.8.2 Structural Walls
- Structural Walls anchorage as opposed to Walls
- Anchor masonry walls into a “reinforced grouted structural element of the wall”

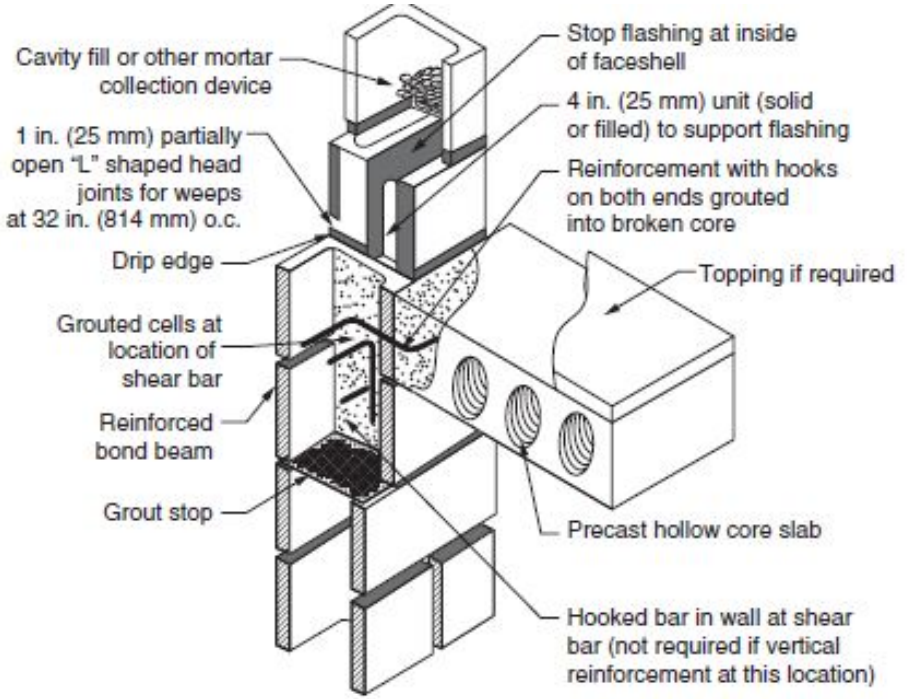


FIGURE 6.32 Example of wall-to-floor connection, planks parallel to wall. (*Source*: Figure 15 of National Concrete Masonry Association TEK 05-07A.)

Load Combinations

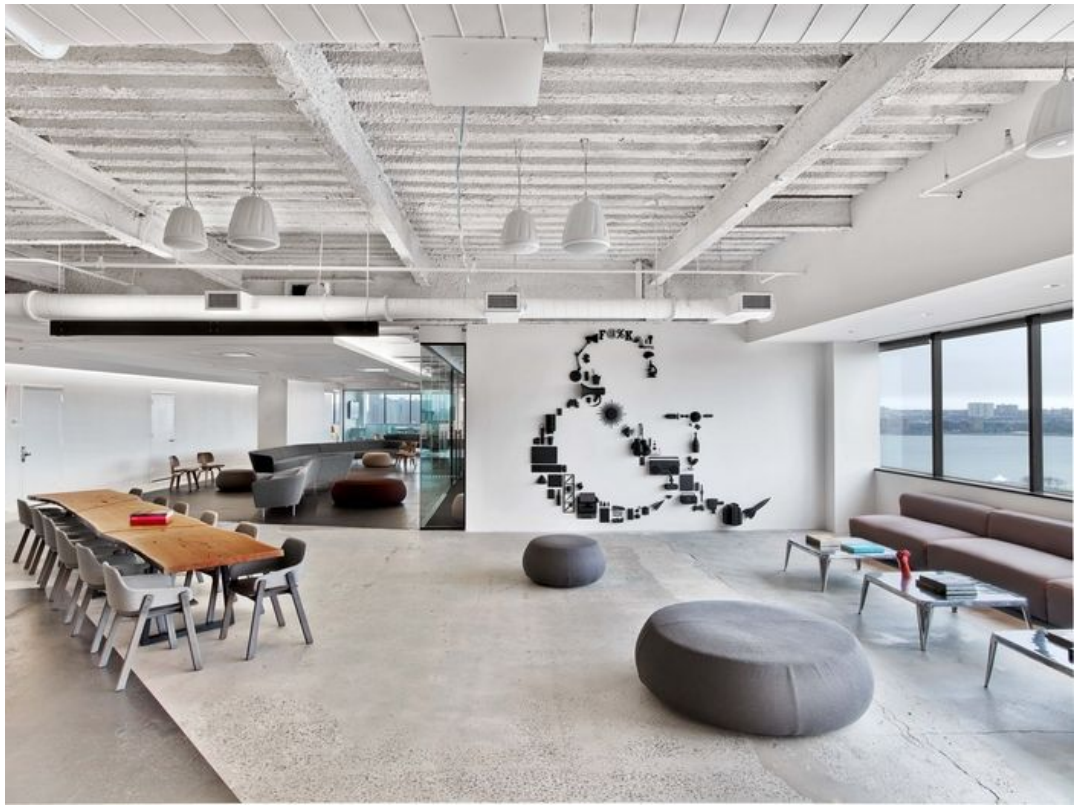
- Section 1605 Load Combinations
- Wind Force Load combinations ultimate not ASD
- Lateral pressures from fluids and earth.

Live Loads

- Table 1607.1 Live Loads, Minimum Uniform and Concentrated
- Stage and platform live loads revised
- Helipad live loading added (see 1607.6 also)
- Occupiable roofs clarified.

Partition Loads

- 1607.5 Partition Loads
- Minimum 15 psf partition allowance is required unless specified live load is 80 psf or greater.
- Note seismic mass calculation effect



10,000# or Heavier Vehicle & Forklift Loading

- 1607.7 Heavy Vehicle Loads
- ODOT/AASHTO design or actual vehicle operational weight if larger
- Impact and fatigue design criteria
- Post Loading Capacity

Façade Access Equipment

- 1607.9.3 & 1605.9.4 Elements Supporting Hoists and Lifeline Anchorages for Façade Access Equipment
- Specifies live loading for hoist supports and lifeline anchorages.

Live Load Reduction

- 1607.10.2 Alternative Uniform Live Load Reduction
- 1607.10.1 LL Reduction can be incorrectly interpreted

Vegetative Roofs

- 1607.12.3 Vegetative Roof Loads
- Calculation of vegetative roof dead load is the saturated weight per ASTM E 2397.
- Also see Table 1607.1 for vegetative roof live loads.

Photovoltaic Panel Systems

- 1607.12.5 Photovoltaic Panel Systems &
  1613.6 Ballasted Photovoltaic Panel Systems
- Specific design requirements for PV panel installations.

Wind Loading

- Section 1609 Wind Loads
- ASCE 7-10 is now based upon ultimate design wind speed values, similar to seismic loading.
- Ohio Risk Category I, Vult = 105 mph
- Ohio Risk Category II, Vult = 115 mph
- Ohio Risk Category III & IV, Vult = 120 mph

1920 Akron Building Code including State Building Code

Section 627. [**Wind pressure—calculation.**] (a) For all buildings or structures irrespective of their location, allowance shall be made for wind pressure acting in any direction, which shall not be figured at less than twenty (20) pounds per square foot of surface exposed from grade to the top of the roof.

(b) Every panel in a curtain wall shall be proportioned to resist a wind pressure of thirty (30) pounds per square foot.

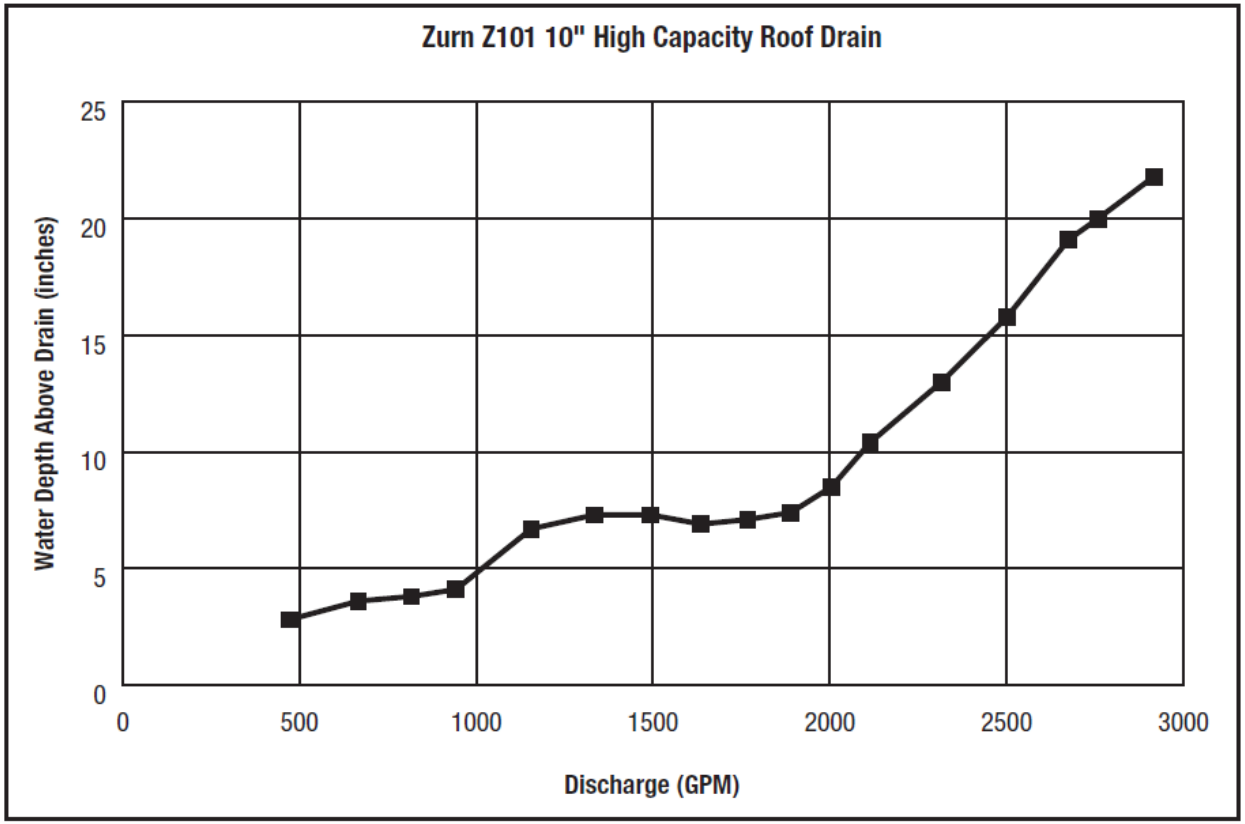
Rain Design Loading for Roofs

- Section 1611 Rain Loads

  1105.2 & 1106.2 & 1106.3 of the Plumbing Code

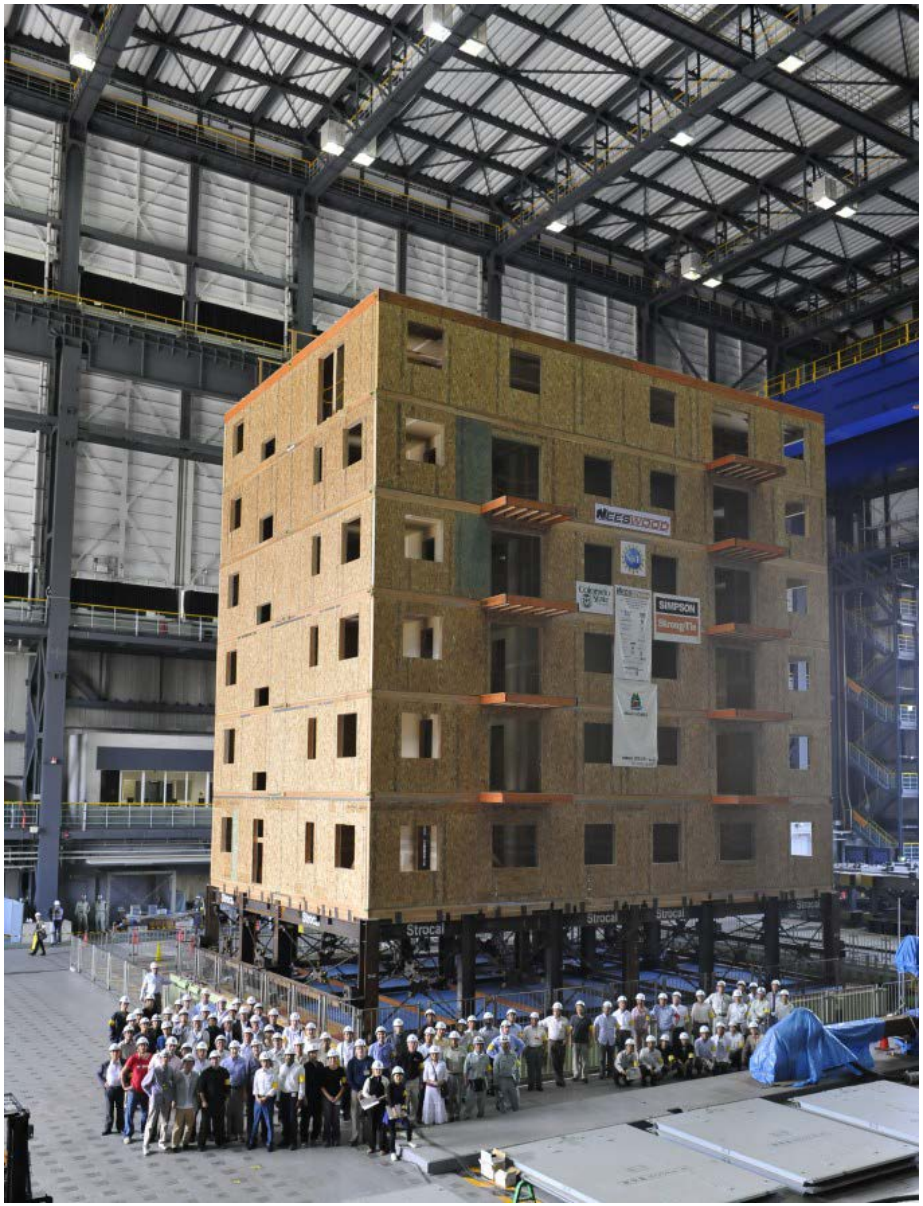
  1503.4 Roof Drainage

- New requirements requires close coordination between the structural engineer, architect, plumbing designer, and the construction details.


Zurn Z101 10" High Capacity Roof Drain
Water Depth Above Drain (inches)
25
20
15
10
5
0
0
500
1000
1500
2000
2500
3000
Discharge (GPM)

Amendments to ASCE 7

- 1613.5.1 Transfer of Anchorage Forces into Diaphragm
- Permitted amendment to ASCE 7 to clarify diaphragm aspect ratio limitation to wood, structural panel, or untopped steel decks.



Ice Loading

- Section 1614 Atmospheric Ice Loads
- New section for design loads for ice build up on sensitive structures.
- See ASCE 7

Chapter 17 Special Inspection and Tests

- There have been numerous changes to requirements in this Chapter which needs to be reviewed for each project.

1920 Akron Building Code Including State Building Code

Section 732. [Special inspector on concrete construction.] (a) When reinforced concrete is used in construction, the owner shall provide a special inspector, who shall be satisfactory at all times to the Commissioner of Buildings and who shall be on the work continually during the mixing and placing of concrete and steel, and the removal of forms. Such special inspector shall make written reports to the Inspector of Buildings. Before placing concrete after steel is in place and before removing any forms from such concrete structure, the said Commissioner shall make an inspection or cause the same to be made before such concrete work is started and before such forms are removed.

(b) Before the reinforced concrete work is started the owner shall name in writing the special inspector.

(c) When reinforced concrete is used in construction the owner shall provide for and have made such tests and inspection of cement, inerts and steel as is required by the Commissioner of Buildings.

Window and Door ASD Wind Pressures

- 1709.5 Exterior Window and Door Assemblies
- Specify wind design pressures on basis of allowable stress design.

Foundation Stability due to Excavation Undermining

- 1803.5.7 & 1804.1 Excavation near Foundations
- Clarifies that a registered design professional will assess the shoring, underpinning, etc. required for excavation that could destabilize foundations.


O'ROURKE

OBC Chapters Referencing Materials

- Chapter 19 Concrete
- Chapter 20 Aluminum
- Chapter 21 Masonry
- Chapter 22 Steel

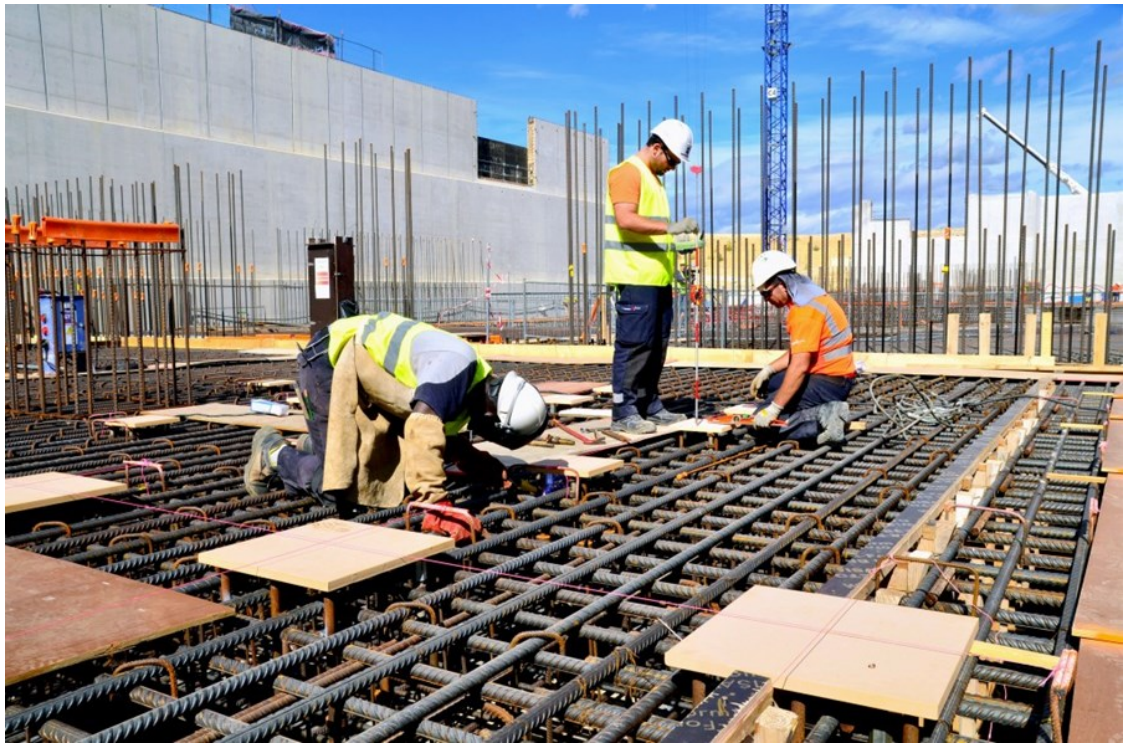
- Many of the OBC/IBC requirements have been removed since they have been picked up in the respective ACI, AA, and AISC code/specifications.

Chapter 19 - Concrete

- ACI 318-14 is now the referenced concrete design code
- New ACI Chapters on Earthquake Resistant Structures and Design and Durability Requirements.
- ACI requirements for information which shall be shown in construction documents.

Concrete Anchor Design

- 1901.3 Anchoring to Concrete
- OBC specifies that anchorage of CIP and post-installed anchors shall be per ACI 318-14.



CLT

- 2303.1.4 Structural Glued Cross-Laminated Timber
- CLT referenced to provisions in ANSI/APA PRG 320-2011.

Wood Frame Construction Manual

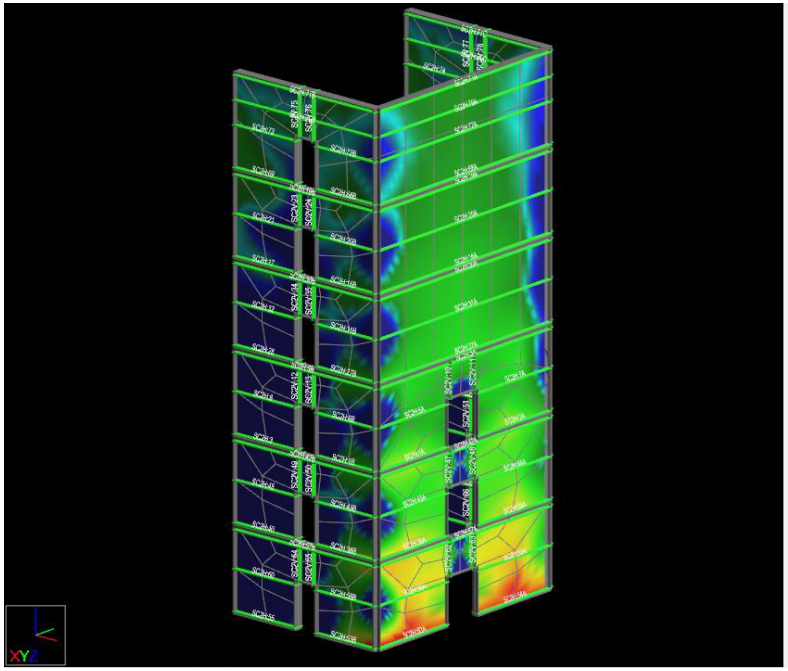
- Section 2309 WFCM
- AWC WFCM - alternate design methodology of Risk Category I and II structures

Chapter 34 - Existing Buildings

- The OBC 2017 includes Chapter 34
- IBC has been gradually steering the existing building code provisions to IEBC as a separate code for over 15 years and with 2015, Chapter 34 has been eliminated from IBC.
- OBC Chapter 34 updated with changes from 2015 IBC provisions from IEBC and ASCE 41 to reduce the seismic penalty for existing buildings in Ohio.

Seismic Design Analysis

- 3401.5 Compliance with Seismic Forces
- In general if a seismic evaluation is required according to Chapter 34 it shall be evaluated either using Chapter 16 or ASCE 41.
- The ASCE 41 evaluation can be by using reduced seismic forces from BSE-1-1E Earthquake Hazard Level.
- Table 3401.5.2 ASCE 41 Seismic Performance Levels vs. Risk Category



Seismic Design for the Repair of Structures

- 3401.5.3 Compliance with Reduced Seismic Forces
- When a seismic evaluation is required by 3405 Repairs, it is permitted to use 75% of the specified seismic forces from Chapter 16.

Additions to Existing Buildings

- Section 3403 Additions
- If Building Additions add loading to existing construction from dead load, live load, snow load, wind, and/or seismic loads; provisions are stated for evaluation of these members.
- The intent is for an evaluation of the cumulative effects of additions and alterations since the original construction.

Alterations of Existing Buildings

- Section 3404 Alterations
- Similarly to 3403, the evaluation is required for existing construction subjected to additional loading, as compared to original construction.

Repairs to Existing Buildings

- Section 3405 Repairs
- Criteria for evaluation and strengthening repair of structures due to forces from dead load, live load, snow load, wind load, and/or earthquake load is dependent on what caused the need for a repair.
- Drifting snow load failure of a member - Repair the member to meet current Chapter 16 drifting snow requirements as a minimum.

Change of Occupancy

- Section 3408 Change of Occupancy
- Changes in occupancy potentially change the Risk Category and therefore may require an evaluation and potential strengthening of the structure.
- There are exceptions in 3408.4 for upgrades required due to snow, wind, and seismic forces to minimize requirements for these upgrades.

The 2017 Ohio Building Code is a living document

The Ohio Board of Building Standards welcomes your input.

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